ZOE

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A BIOLOGICAL JOURNAL.

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THE PROPOSED AMENDMENT TO THE CONSTITUTION OF THE CALIFORNIA ACADEMY OF SCIENCES.

The proposed amendment, if adopted, will in time bring the society into line with the American Association for the Advancement of Science. It is substantially the same as the principle set forth in the circular of that great organization, issued preliminary to their meeting at Indianapolis in August of the present year:

"Any person interested in science and advanced education can become a member of the Association on being proposed by two members and elected by the Council. From the members nominations are made for fellows, who must be persons who are professionally engaged in science, or who have by their labors advanced some branch of science; and from the fellows the officers of the Association are elected. The object of this arrangement is to keep the management of the Association strictly in the hands of active workers in science, while at the same time the large number of persons interested in all that advanced education calls forth may feel that they are welcome, and that the way is open to their election as fellows, if they belong to the group of advanced workers in any department of science."

The amendment applies of course, only to those who shall be hereafter admitted; those who came into the society in earlier times, from a generous desire to help it to a larger usefulness, and who, if not properly considered scientists, have imbibed something of the spirit which animates them, will remain in full fellowship.

In a very different relation to the society stand the large number of persons now clamoring for admission. While the Academy was struggling and poor, they stood aloof and stigmatized the members as "fossils" and "cranks," and playfully quoted "The Society on the Stanislaus;" now that its prosperity is assured, they are ready to throng it, and wrest by force of numbers its control from those who have so long worked for its welfare.

This state of things is not to be permitted. There is a growing sentiment in favor of such restriction as shall make the society true to its name. The working members and a considerable number of

their non-scientific friends, whether a majority of the members or not remains to be seen, are willing to admit to associate membership the large body of estimable persons, who are interested in scientific matters and in all advanced education, but intend to retain in the hands of the rapidly increasing scientific element the management of the society founded for Science.

One of the strongest reasons in favor of this restriction is the difficulty of making the aim of scientific labor intelligible to people in general. The great majority appear to think that the mission of scientific societies is to teach, while every worker in science knows that its object is to investigate, and to discover new truths, leaving to the vast body of educators the congenial task of making these new facts known through all the walks of life. The way in which these irreconcilable views affect the management of societies must be apparent to every one. The progress, the standing among other societies, the very life of the society itself depends upon the number, force and ability of its working members; yet in a mixed society they are continually hampered and thwarted by the demand of the non-scientific members for instruction, amusement or even for mere superficial display.

This aspect of the mixed societies has been well set forth editorially in the April number of the *American Naturalist*, than which there is no higher authority in America:

"The age demands knowledge, and provision is being gradually made in this country for the producers of it. The time is not far distant, we suspect, when the confusion between the producers and the distributors of knowledge, which is so prevalent, will disappear. Millions are expended for the dissemination of knowledge through the medium of schools and libraries while small sums only can be obtained for the production of new truth. The increase in the number of producers in science is educating the public mind, and one great need, that of institutions of original research, will be supplied. * * * The increase in original investigators holds forth a promise of the organization on a true basis of academies of science in our States. Those in existence having commenced by electing everybody who can pay the necessary fees, have mostly lost their scientific character, and have sunk into inaction. Little can be done with them, since those into whose hands they have fallen are generally unwilling to adopt the necessary changes. But the times will soon be auspicious for the organization of new bodies, whose membership will be an order of merit, and a recognition of work done."

There are in the United States several societies besides the American Association for the Advancement of Science, which hold fast to

this principle in the conduct of their affairs. Unquestionably the ranking scientific society in America, membership in which is more eagerly coveted than in any other, is the American Academy, which restricts its membership of all grades, to scientists, and even goes so far as to disfranchise any member removing his residence from Massachusetts.

Among the societies on this coast, one of the most important, the Technical, has a similar provision in its constitution, and no matter how eminent a proposed member may be, how strong his sympathies or how long his purse, he can be only an associate member unless he is a practical engineer.

If this amendment be adopted by the California Academy of Sciences, its effect will of course in time be, that the society will have only scientific members. An impression appears to prevail in some quarters that this would be a menace to its financial interests; that wealthy men without scientific attainments would be less liable to make bequests to the society, if they could not become voting members, and that scientific men lack the business ability to manage its affairs.

The first objection is easily disposed of. Honorary membership, which carries no vote in any society, is not less esteemed or sought for than any other grade, and the certainty that bequests will be applied in accordance with the needs of science will far more than counterbalance the lack of a vote, which would probably never be exercised.

The second one is founded on the current fallacy, that scientific pursuits necessarily imply a lack of common sense. That there are child-like and unworldly scientists every one knows, but the greater number are plain ordinary human beings, with quite sufficient financial skill to take them through the complicated processes of collecting rents or cutting off coupons, besides which the society has now sufficient non-scientists to provide against such visionary dangers for thirty or forty years to come, and as a curious corollary to these fears, it may be stated that the only money loss the Academy has met with was through the careless business methods of a body of officers entirely without scientific pretensions.

FRESH-WATER MOLLUSCA OF SAN FRANCISCO COUNTY.

BY J. G. COOPER.

When residing in San Francisco about twenty years ago, I made a list of the species then known to inhabit the county, and considering the changes since made in the topography of the country by the progress of improvement, it may be interesting in future to compare the list with what may be found there at later dates. In a late article on the Land Mollusca of the Bay Region I remarked that three species had been introduced by human agency, and were becoming naturalized. It is very probable that some fluviatile species may be hereafter found in reservoirs and artificial ponds, brought from other parts of California by accident, such as adhesion of their shells or eggs to the feet of water-birds. As an evidence of such occurrence elsewhere I may mention that Mr. W. J. Raymond found three species which seem to have been introduced since San Jose reservoir was constructed, viz., Nos. 1, 4, 10, following, and *Sphærium lenticula* Gould, none of which I found in the Los Gatos Creek on a former visit there. I have also observed the occurrence of *Limnophysa adelinæ* in large numbers in a spot in San Lorenzo Creek at Haywards, one year only, not finding a single one before or since.

Next to the great interior valleys the little county of San Francisco shows a larger list of aquatic species than any coast county south of it, or any yet known in the Sierra Nevada.

1. Limnosphysa palustris *Linn.*, and varieties proxima *Lea*, nuttaliana *Lea*, rowelli *Tryon*.
2. Limnophysa gabbi *Tryon* and var. adelinæ *Tryon*.
3. Limnophysa humilis *Say*.
4. Limnophysa obrussa *Say*.
5. Physa diaphana *Tryon*.
6. Physa virginea *Gould*.
7. Physa gabbi *Tryon* and var. dorbignyana *Lea*.
8. Planorbis tumens *Carpenter* (occidentalis *J. G. C.*).
9. Planorbis *(Helisoma)* ammon *Gould* (dwarfed).
10. Planorbis *(Gyraulus)* vermicularis *Gould*.
11. Planorbis *(Menetus)* opercularis *Gould*.
12. Ancylus fragilis *Tryon*. (Gundlachia?)

13. Pomatiopsis intermedia *Tryon.*
14. Anodonta nuttaliana *Lea*, var. wahlamatensis.
15. Pisidium *(abditum)* occidentale *Newcomb.*

As a comparison of numbers of species, I may refer to the "Shells of Antioch and vicinity," found by Mr. Carlton and others in the east end of Contra Costa County, twenty-five species and varieties. In Clear Lake I only found eleven; in Sierra Nevada, near latitude 39°, thirteen are known; and Mr. Raymond found eleven near latitude 38°, besides eight in San Jose reservoir, the same number known from Santa Cruz County.

[NOTE.—I have ascertained that the name CALYCULINA has been given to the same group to which in Proc. Cal. Acad. ser. 2, iii, 82, I applied the name PRIMELLA. The latter is therefore a synonym, unless Sphærium, for which, however, there seem to be other available synonyms, should be dropped.—J. G. C.]

A NEW FERN FROM LOWER CALIFORNIA.

BY D. C. EATON.

With Plate VII.

ASPLENIUM BLEPHARODES, sp. nov.—Rootstock short, creeping, the scales minute, blackish, narrow and rigid; stalks short, rather stout, blackish-red, ferruginous-puberulent; fronds erect or curving, six to nine inches long, linear-lanceolate, pinnate; pinnæ numerous, chartaceous, mostly opposite, nearly sessile, the lower ones mostly somewhat auricled on both sides and deflexed, the middle ones half an inch long, oblong, obtuse, truncate and slightly auricled at the upper side of the base, finely serrate with obtuse teeth; sori six or eight to a pinna, placed near the midvein, the indusium fringed with slender jointed hairs; sporangia dark brown, the annulus about 20-jointed; spores dark, ovoid, covered with anastomosing winged ridges.

Sierra de Laguna, Lower California, T. S. Brandegee, January 22d, 1889.

This plant has much the habit of *Asplenium parvulum*, but is rather stouter and less rigid. The beautifully ciliate indusium is a most distinct character, as the indusium of *A. parvulum* and the other allied species is nearly or quite entire.

THE SEQUOIA FORESTS OF THE SIERRA NEVADA—THEIR LOCATION AND AREA.*

With Plate VIII.

By FRANK J. WALKER.

In the Standard Guide Book to the Pacific Coast, of a late issue, we read this statement: "There are nine groves of big trees in California;" and in the descriptive sketch following this remarkable statement, we find three of the nine groves mentioned as lying south of King's River, vaguely described as: The King's River grove, the grove in the basin of North Tule, and the grove in the basin of South Tule. There are in the localities named, as containing three, no less than seven distinct groves and forests of big trees, while in the enumeration given there is no mention whatever by the author of the several groves and forests of Middle Tule, Kern or Kaweah rivers, nor of the most southern grove, on Deer Creek; in short, the omissions comprise some twenty distinct Sequoia groves and forests, aggregating an erea of at least 25,000 acres. Few, indeed, of the inhabitants of Tulare County, where most of the forests are found, have any conception of the wide extent of their Sequoia possessions; probably not one person in five hundred knows of the existence even of big trees on the Kern River slope, and many would dispute the fact—a fact I have never seen referred to in print—and yet there are no less than 2,000 acres in that region, and some of it the most dense forest growth of *Sequoia gigantea* known to man. And so with other groves; many of them are to the general public practically unknown and unexplored.

The accompanying map is the first ever published with an approximate showing of the area, location or existence even of what is by far the larger part of our Sequoia possessions.

With reference to this map, it is my purpose in this paper to briefly mention what may be termed the forests of Sequoia, and the neighboring groves; and in making the distinction between forests and groves, it will be necessary to draw a somewhat arbitrary line; and for this purpose we will classify as forests all areas of 1,000 acres or upwards, and all below that as groves. According to this distinction we can safely assume that all forests of *Sequoia gigantea* are to be found to the south of King's River, and nearly all of them

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*Read before the California Academy of Sciences, September 1, 1890.

in Tulare County; and, with mere mention of the better known northern groves—the Calaveras, South Park, Tuolumne, Merced, Mariposa, Fresno and Washington—we will therefore confine our sketch to a description of this region only.

The first, going southward, and probably the largest compact body of all, is located on the south slope of the South Fork of King's River, in Fresno County. It is designated on your map as Converse Basin Forest. Its location may be given more exactly as in the northeastern portion of Township 13 South, Range 27 East, and the northwestern part of Township 13 South, Range 28 East, M. D. M., the larger part being in the latter township. [Please bear in mind that all townships and ranges hereafter given are south and east of Mount Diablo Meridian.] The area of this tract is about 5,000 acres. These figures can at best be but an approximation. For most part, the Sequoia country is so broken, and the variation of density of growth so great, and the limits so vaguely defined, that an exact estimation is almost impossible; besides, it is likely to be misleading from the fact that it represents in some instances what might be called a heavy continuous growth, while in others it is more or less broken and scattering. In nearly all cases there is found mixed with the Sequoia a plentiful growth of other timber, principally yellow and sugar pine (*Pinus ponderosa* and *Pinus Lambertiana*), with a sprinkling here and there of fir, cedar and other growths. However, I have aimed everywhere to keep my estimates of areas well within bounds. This first forest, together with the one next in order, are owned by one of the leading lumber firms of California. And, next Wednesday, they celebrate at Sanger the completion of their forty-mile lumber flume, connecting their capacious mills in the mountains with the railroad on the plains. They propose to clean up everything as they go along, stripping the land bare and moving their mills and extending their flume from point to point as the timber supply becomes exhausted. It will probably take years for them to reach the Boulder Creek Forest, in Township 13, Range 29, so named from the affluent of King's River, on whose slopes it is found. The area of this forest and neighboring groves cannot be less than 1,500 acres, probably more. These two already mentioned, lie altogether on the waters of King's River, in Fresno County, but the forest next to the south, the Fresno Big Tree Forest, is on the divide between the waters of King's and Kaweah

rivers, partly in Fresno and partly in Tulare counties. It lies in the contiguous corners of the four Townships 13 and 14, Ranges 27 and 28. Its original area cannot be computed at less than 2,000 or 3,000 acres, but so much of it has been stripped of its timber that its limits are hard to determine. Here have been the principal milling operations in Sequoia for the past twenty years. Four sections of it, containing what is known as the "Fresno Big Trees," have already been reserved by the United States Government, it being the only reservation ever made in these southern forests for the purpose of saving the Sequoia. This is the reservation recently confirmed by the Hon. Secretary of the Interior, and containing the famous big tree known as "General Grant," said to be forty feet in diameter.

Passing on to the west side of Township 14, Range 28, we find along Redwood Creek a forest of some 3,000 acres. This most magnificient growth has also passed from the possession of the Government to private ownership. Farther south, we next come to a forest on the North Fork of the Kaweah River in the northwest portion of 15–29 and extending northward across the line into 14–29. There are here upwards of 1,500 acres of Big Tree forest still owned by the Government. The whole township is timbered and well worth preserving, aside from the Sequoia.

A few miles southward brings us to the Sequoia tract, known as the Giant Forest, located in the contiguous corners of Townships 15 and 16, Ranges 29 and 30, where there is found an area of some 2,300 acres of Sequoia. This, although still in the hands of the Government, is claimed by individual locators, by reason of their locations having been made in good faith and filed previous to the withdrawal from entry of these townships, as explained hereafter. It is generally thought that they will substantiate their claims and acquire the land, and public sentiment seems to favor it. Passing to the Middle Fork of Kaweah River, we find several groves, some of which are still in the hands of the Government, but there exists on this branch no Sequoia tract that could properly be called a forest.

Southward, on the East Fork of the Kaweah River, we come to what is designated as the Mineral King Forest, from a mining district of that name, comprising, with the detached groves, some 3,000 acres; the main body is in Township 17, Range 30, the township whose recent restoration to entry gave rise to the move-

ment culminating in what is known as the Vandever Sequoia Park Bill, lately passed in the lower house of Congress. In December, 1885, Commissioner Sparks, of the General Land Office, withdrew from entry eighteen certain townships, of which this was one. The reason for this suspension was the alleged fraudulent character of the surveys. We need not consider the condition of these surveys; but, from the character of the country, it would seem that the sub-division lines of Township 17, Range 30, could be more readily run with a ruling pen than with chain and transit; and at that time the compensation for either system of survey was supposed to be the same. But one thing is certain, on many of the Government plats you will search in vain for any trace of Sequoia growth, even where the alleged lines run through sections now known to be heavily timbered with the mountain redwood. It is to this fact largely, no doubt, that the very existence of certain Sequoia forests has so long remained unknown to the public.

The fact that several of the suspended townships contained big trees had nothing whatever to do, so far as we know, with influencing the act of the Commissioner. But Commissioner Sparks "builded better than he knew," and the ultimate outcome of his order of withdrawal has been to preserve, in the Government's undisputed possession, several forests of these big trees that would otherwise have gone the way of all the rest into the hands of speculators and lumbermen. Thus the matter remained in *statu quo* till the opening of the present year, the friends of Sequoia preservation resting easy in the fancied security of their position, inasmuch as the Department had expressly declared its policy not to restore to entry these lands in advance of an official examination. At the opening of the present year, parties interested in acquiring timber, by some means, secured the release of the suspension of Township 17, Range 30. It was restored to entry on May 23d and in less than six weeks the entire Mineral King Forest was filed on by timber-land claimants, and the tract effectually cleaned up. While thus the greed for big tree timber was developing, the supply was growing short, and the attention of timber prospectors was turned to other forests; and it was found that in the township to the south, Township 18, Range 30, there was a forest practically unexplored that offered the best field for their next work. The same measures that had proved so successful in opening up Township 17, Range

30 were forthwith set to work to secure this more valuable prize. At this juncture a few citizens of Tulare County took steps to thwart the attempted spoliation of the Sequoia forests. As the forest in Township 18, Range 30 was the one the timber men most wanted, the inference was reasonable that it was the best of all for the Government to keep. We need not detail the ways and means adopted, but the ultimate outcome of the opposition has been the Vandever bill, embracing in its proposed reservation two townships and four sections to be set apart as a National Sequoia Park. This reservation includes the forest marked on your map as the Sequoia Park Forest, and also the larger part of the Homer Peak Forest, somewhere from 3,000 to 5,000 acres. South of these, following the Sequoia belt, in Township 19, Range 30, we come to the Dillon Mill Forest, of over 1,000 acres, with but little remaining to the Government, and from which thousands of Sequoia fence posts are being hauled this season. And still farther southward, partly in the southeast corner of the same township and extending into the corners of three other townships, is the Tule River Forest. Much "cutting and slashing" for a period of years, of which Prof. Eisen told you at a late meeting, has here been going on; and during this time different mills have been drawing their supply of mountain redwood from this forest; and still by far the larger part remains. Here exists a noted center of Sequoia growth known as the "McFadyen 80," (acres) estimated by lumbermen to have on it timber sufficient for 8,000,000 feet of lumber. Only one mill is running this season. This, with the Pixley Grove, we will estimate at 3,500 acres. About six miles directly south is the Putnam Mill Forest, in Townships 20 and 21, Range 31, containing some 4,000 acres. A portion of this, that in Township 20, Range 31, is still owned by the Government and is a very beautiful forest of over 1,000 acres. In the northeast of this same Township 21, Range 31, and extending into the adjoining townships, is found the Fleitz Forest, owned by a Michigan syndicate; while in the southeast portion of the same township and extending into Township 22, Range 31, are groves owned by the syndicate known as the "Kessing," the several tracts comprising an area of some 4,000 acres. Here again, in the southwest of Township 22, Range 31, the Government possesses a forest of somewhat uncertain value and extent, known as the Indian Reservation Forest, and estimated at 1,500 acres. It is not generally known

that there exists any Sequoia on the Kern River slope, but there are on that side at least 1,500 or 2,000 acres in groves scattered along the slope from Freeman's Valley southward for some fifteen miles. Only one of these tracts could be classed as a forest, that of Freeman Valley. Here is a tract of about 1,000 acres, a limited portion of which is probably the heaviest growth of *Sequoia gigantea* in the world. Unfortunately this also has passed into the hands of lumbermen. One grove more remains to be mentioned, not because of its intrinsic merit, but because of its location, it being, so far as known, the southernmost limit of Sequoia. It is that on Deer Creek, indicated on older maps as "Mammoth Grove." It contains less than 150 Sequoias, scattered over an area of perhaps 300 acres.

This completes the list. The Sequoia forests proper therefore extend over a belt of country beginning at Converse Basin on the north, and ending with the Indian Reservation Forest, sixty miles to the south. The groves and forests together in this region are upwards of twenty in number, with an average distance between them of perhaps three or four miles.

Within this scope of country, a moderate estimate of the Sequoia area would be, according to the foregoing figures and including a few unnamed groves, 37,500 acres, divided between the several river systems as follows:

King's River	7,500
Kaweah River	14,000
Tule River	14,000
Kern River	1,700
Deer Creek	300
Total acres	37,500

It has been sufficiently shown that there are in the State several forests and groves of big trees still belonging to the Government, aside from those embraced in the Vandever bill. To insure the safety of these, and to put them beyond the designs of timbermen, and above all, to protect them from devastating forest fires, it is exceedingly desirable that they be reserved and placed under expert supervision. We need no reminder that the greed of timber- and cattle-men will soon work havoc with what remains, unless something be done to stay the devastation; and if we would save a portion we must begin at once.

Concerning the utility of the region embraced in these limits as the best natural reservoir for the storage of waters needed for irrigation, we need not dwell. But for a moment let me touch on the suitability of the country for a park because of its charming natural attractions. You need hardly be reminded of this. The heart of the Sierra culminating in Mount Whitney affords grand scenery of peculiar charm and great variety. Here are three Yosemites rivaling their noted prototype in many features, with a little world of wonders clustering around the headwaters of Kern, Kaweah and King's rivers. We will simply mention the Grand Cañon of the Kern, where, for twenty miles, the mad waters of the river are walled in with the continuous battlements of the California Alps, crowned with nameless and unnumbered domes and towers. Then, only a few miles across the divide, extends the cañon of King's River with its wealth of impressive scenery, and some eight miles farther to the north lies the valley of Tehipitee—the gem of the Sierra—with its wonderous dome of rock rising in rounded majesty some 6,000 feet from the level of the river-cleft meadow at its feet. Yet a view of the most impressive and characteristic scenery of the region is to be earned by scaling one of the lofty peaks of the Kaweah Range. At least a hundred peaks here rise to altitudes exceeding 10,000 feet. One never can forget the impression, who has once looked out over the California Alps from the pinnacle of Miners' Peak. As I once before said, in describing this scene: "Here amid the companionship of peaks one beholds with speechless wonder the spectacle beyond. No satisfactory view of the Whitney Range can be found from the San Joaquin plains. The intervening Kaweah Range veils the view of the higher peaks beyond. But here, standing on the crest of the Kaweah Sierra one looks across the Grand Cañon of the Kern and the encircling wilderness of crags and peaks is beyond the power of pen to describe. Mounts Monache, Whitney, Williamson, Tyndall, Kaweah and a hundred nameless peaks—the crown of our country—have pierced the mantle of green that clothes the cañons below and are piled into the very sky, jagged and bald, and bleak and hoary—a wilderness of eternal desolation."

NOTES ON THE NATURALIZED PLANTS OF SOUTHERN CALIFORNIA. V.

BY S. B. PARISH.

THE CHILIAN GROUP. — This convenient but misleading term may be used to designate a considerable number of plants common to the western shores of North and South America in their respective temperate zones. Situated in the south, between the same parallels of latitude as California in the north, Chili has a similar climate and soil and same general likeness in configuration. But their partial identity of vegetation cannot be explained by such physical resemblance. It sometimes exists in countries otherwise quite dissimilar, or is lacking in those having like conditions in many respects. When it can be traced, although between regions now unconnected, it is held to be evidence of vegetable migrations due to causes in the remote past, the consideration of which affords a common ground for the geologist and the botanist.

No such traces of a common flora exist upon the eastern side of the two continents, but their western coasts sustain a remarkable number of identical genera and species, not to mention others which are represented in the one country by close analogies in the other. Some are confined to the border of the sea, while others extend their range to a greater or less extent eastward, a few in both latitudes reaching the Atlantic. All, however, are typically western, and have in the west their centers of distribution.

The following list includes most of those genera found in both Chili and California, which are not represented in the two countries by the same species:

TABLE OF GENERA.*

Vesicaria,	**Osmorrhiza,**	**Actinella,**
Malvastrum,	**Gutierrezia,**	**Microseris,**
Sphæralcea,	**Aplopappus,**	**Downingia,**
Larrea,	**Micropus,**	**Menodora,**
Hoffmanseggia,	**Adenocaulon,**	**Erythræa,**
Gayophytum,	**Jaumea,**	**Coldenia,**
Boisduvalia,	**Lasthenia,**	**Amsinckia,**
Godetia,	**Bahia,**	**Orthocarpus,**
Mentzelia,	Blennosperma,	Chorizanthe.

* This and the succeeding list of species are compiled, with additions, from Hooker and Gray, Veget. Rocky Mts., 58.

But not only are these common genera, but, descending to species, we find no small number which are equally at home in the two countries. The most important are included in the subjoined

TABLE OF SPECIES.

Myosurus aristatus,
Sisymbrium canescens,
Pentacæna ramosissima,
Elatine Americana,
Trifolium Macræi,
Trifolium microdon,
Hosackia subpinnata,
Prosopis juliflora,
Acæna trifida,
Tillæa minima,
Œnothera dentata,
Bowlesia lobata,
Valerianella samolifolia,
Baccharis glutinosa,
Amblyopappus pusillus,
Madia sativa,
Soliva sessilis,
Specularia biflora,
Microcala quadrangularis,
Gilia gracilis,
Gilia pusilla,
Polemonium micranthum,
Phacelia circinata,
Plagiobothrys rufescens,
Pectocarya linearis,
Pectocarya pusilla,
Mimulus luteus,
Plantago Patagonica,
Plantago hirtella,
Allionia incarnata,
Parietaria debilis,
Callitriche marginata,
Oxytheca dendroidea,
Lastarriæa Chilensis,
Lilæa subulata,*
Scirpus Tatora,
Muhlenbergia debilis.

These plants are somewhat less exclusively western than are those in the former list; still they will be seen to be for the most part distinctly accidental. In this State a very few of them are confined to the vicinity of its northern boundary, but every remove southward adds increasing numbers, even till the southern line is reached, over which some species barely pass. Were we to extend our survey still farther south, the list might be materially increased. They are a part indeed of what we call the Mexican element in our flora, which is itself but a section of the great Cordilleran flora which follows along the backbone of the two continents.

What may have been its origin and what its past migrations along the western flanks of this vast mountain chain is beyond our purpose here to inquire. It is enough to point out that so many species are common to both Chili and California, that the presence in either

* Lilæa is described as having "thin, grass-like" leaves, but they are terete and vesicular in the Californian plant with which I am acquainted. This is not evident in dried specimens, so that the description may easily be erroneous. Otherwise our plant is distinct. In either case the generic character must be amended.

country of any particular one does not authorize the presumption that it is not there indigenous. Positive evidence, either historic or drawn from the circumstance of its growth, must be produced to justify its removal from that rank.

Indeed most of the species above enumerated have been regarded by botanists as natives of this State. A few, however, have been selected, with confidence or with doubt, as introductions. They are indicated in the list by italic type.

The possibility of such an introduction is thus cautiously suggested by Gray and Hooker: "There are a number of plants indigenous to Chili, the presence of which in California, where they are seemingly no less indigenous, may be accounted for by immigration of men and cattle. This may have been the case with Pentacæna, Acæna, Valerianella samolifolia, Bowlesia, Amblyopappus, Pectocarya, Lastarriæa, and the like."*

I do not know that any others have expressed this doubt respecting Pentacæna, Acæna, Bowlesia and Valerianella, and the first three are included among our native plants by the Botany of California, and the last both in that work and in the Synoptical Flora.

Regarding the others more uncertainty has prevailed. Thus in 1876 Dr. Gray mentions the Californian Soliva as *S. daucifolia* Nutt., remarking that it is "much like *S. sessilis* of Chili,"† to which species he afterwards reduced it. In 1881 he questions if it be not a "North American species immigrated" to Chili.‡ In 1884 he makes the contrary note, "Chili; whence probably introduced" into California,§ but includes it among the natives in the enumeration of genera and species.

The same distinguished botanist regarded Microcala with like uncertainty. In 1876 he says that it inhabits "hillsides and moist meadows about San Francisco, Martinez and Vallejo, where it may readily have been introduced. But also on the coast, near Mendocino, so that it may be indigenous."¶ In 1878 he says that it is a native of the "Coast of California, from Mendocino southward."‖

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*Veget. Rocky Mts., l. c.

†Bot. Cal., i, 405.

‡Veget. Rocky Mts., 59.

§Syn. Fl., 1, ii, 365.

¶Bot. Cal., i, 480.

‖Syn. Fl., 2, i, 112.

In 1880 he was of the opinion that "Microcala has probably been introduced into California from South America,"* but in 1886 he enumerates it as a native species.†

Specularia biflora is said to grow "near towns and settlements near the coast; perhaps introduced from South America."‡ In fact this plant is a shy inhabitant of damp and shady places in the hills, secluded in habit and not enduring tillage. The Synoptical Flora unquestioningly sets it down as native, and later it is so given in the enumeration. In the Flora of Guadalupe Island, Watson speaks of it as "possibly introduced from Chili; perhaps indigenous to both countries."§ Other botanists, without exception, I think, have regarded it as a native plant, an opinion in which field observers will certainly concur.

At the publication of the Botany of California *Amblyopappus pusillus* was known in North America only from "about San Diego, and on the Island of Guadalupe," and it is there suggested that it had been introduced from Chili. Its presence on that lone island had seemed to Dr. Watson to "rather favor the belief that it is a native of the west coast" of the United States,‖ but did not prevent him from counting it among the introduced plants. Dr. Gray gives its range in the Synoptical Flora as "San Diego and southward," and records it as a native both in the text and in the enumeration. Prof. Greene has expressed the same opinion. That it is so can hardly be doubted in view of the number and character of the stations at which it has been recently collected. These greatly extend its range, which is now known to include most of the coast islands from San Miguel to Cerros, and the littoral region from Monterey southward to San Enrique on the Peninsula.

The following are the known stations: San Miguel, Greene, Pitt. i, 90; Santa Rosa, Brandegee, Proc. Cal. Acad., 2d ser. i, 213; Santa Cruz, Greene, Bull. Cal. Acad. ii, 404; Anacapa, Yates, 9th Rep. Cal. State Miner. 184; Santa Catalina, Lyons, Bot. Gaz. xi, 334; Guadalupe, Palmer, Proc. Am. Acad. xi. 113, Greene, Bull. Cal. Acad, i, 224; San Benito, Palmer, Contr. U. S. Nat. Herb. i, 21; Monterey, Parry, Bot. Mex. Bound. 96; San Luis Rey, W. F.

*Veget. Rocky Mts., 40.

†Syn. Fl., 2, i, 468.

‡Bot. Cal., i, 446.

§Proc. Am. Acad., xi, 109.

‖ l. c., 113.

Parish; San Diego, Cleveland; Lower Cal., "from San Enrique across the peninsula to San Quentin," Brandegee, l. c. ii, 178.

Pectocarya is represented in the United States by four species, two of them extending the whole range of the Pacific coast from the British to the Mexican boundary. The third, *P. pusilla*, reaches from Washington to northern California, while the remaining one, *P. linearis*, inhabits the arid regions of southern California, Utah and Arizona. These two are found also in Chili. The Botany of California says, somewhat enigmatically, that they "inhabit the western coast of America, from Chili to California; perhaps diffused since the introduction of sheep and cattle." In which direction this diffusion is supposed to have occurred is not stated. In the Synoptical Flora and in the appended enumeration both are regarded as native. The same disposition is also made of *Plagiobothrys rufescens*, although this is said in the text to be "perchance introduced from Chili."*

Lastarriæa Chilensis occurs in North America, from Antioch, in central California,† to Ascension on the Peninsula.‡ In 1871, Dr. Watson confidently pronounces it a "Chilian species, introduced into California."§ Ten years later he says more hesitatingly, "Perhaps introduced from Chili to California by sheep and cattle."‖ Dr. Parry, who made a special study of the Eriogoneæ, and had the advantage of long and wide field observation, says that it is "probably native to both Chili and California,"¶ and at a later date calls it, with greater positiveness, "a native of the Pacific Coast of North and South America."**

It will be seen from this brief review that doubts respecting the indigenous character of these plants have usually been expressed with hesitation, and often abandoned upon fuller knowledge. They seem to have been selected rather arbitrarily from among their fellows whose claims to Californian nativity are undisputed. Some, but not all, are provided with arrangements whereby their seeds may be easily carried in the pelage of domestic animals, and this possibility has suggested the doubts which have been expressed re-

*Syn. Fl. 2, i, 431.

†Parry, Proc. Davenp. Acad. iv, 63.

‡Brandegee, Proc. Cal. Acad., 2d ser., ii, 204.

§Bot. King, 477.

‖Bot. Cal. ii, 39.

¶Proc. Davenp. Acad. l. c.

** ib. v, 36.

specting them. But this suspicion has not attached to other species of the list which are provided with similar means of dissemination, and on the other hand I find no evidence that flocks and herds have been brought to our coast from Chili. Certainly it is very unlikely that they should have been brought by water, and if by land they have curiously enough failed to introduce the plants in the intervening region.

It was indeed quite natural that they should have been regarded as exotic when less was known concerning them than at present. Occasionally a specimen of some known Chilian species was brought from the Californian coast, with scant record of its habits or range. That they were not more positively set down as intruders shows the wise caution of our botanical authorities.

They are now better known and are found to be components of a well-marked element in our flora, which it is impossible to regard as other than indigenous, and from which no valid reason has been given for separating a part. Not one of them is a weed of the highway, or is even able to persist in cultivated fields. On the contrary, they inhabit deserts and arid mesas, secluded nooks in the hills, solitary coasts or unpeopled islands. One who knows them in these places will require the most direct evidence to convince him that they are not indigenous, and in default of such evidence they may be admitted as belonging to the native flora of the State.

A NEW EPILOBIUM.

BY WILLIAM TRELEASE.

E. Parishii. Tall, at length stout and rather intricately slender branched, even from the base, glabrous below, the inflorescence and capsules very sparingly, the young buds densely white-pilose or incurved-pubescent; leaves rather thin but firm, all glabrous, lanceolate, very obtuse or the reduced flowering leaves acutish, somewhat unequally serrulate or denticulate, 1 to 3 in. long, gradually or abruptly narrowed to the slender more or less elongated petiole; flowers at length numerous, erect, rosy to violet, rather small; capsules 50–70 mm. long, their pedicels 10–20 mm.; seeds broadly fusiform, short-beaked, coarsely papillate, .4 x 1 – 1.25 mm.; coma pure white.— San Bernardino Co., Cal. (Parish, Nov. 1889, Nos.

2094 and 2095, the former apparently summer seedlings from the first fruit of the latter); near Todos Santos, Lower California (Brandegee, Jan. 22, 1890).

Of the *coloratum* section; in habit coming somewhat nearer *coloratum* than other Pacific Coast species do; in pubescence very near *E. Californicum* Hensh.

DOUBLE BROODS OF ARGYNNIS CALIPPE.

BY H. H. BEHR.

On the 19th of September I saw a specimen of *Calippe* in the streets of Livermore, and settling repeatedly on moist ground. The following day I noticed two more specimens at the entrance of Arroyo del Valle, near Mr. Wetmore's place, settling on Aplopappus and Solidago flowers.

All these specimens were fresh and evidently not on the wing for more than a day or two. I probably would have observed a more considerable number of them if circumstances had favored closer investigation.

Now these insects were not mere stragglers, they evidently were members of a second brood. I do not know of any double-brooded species of the Aglaia type. The literature at my command gives no opportunities to ascertain if a second generation of Aglaia or Cyrene has been perhaps observed in the Mediterranean region; in Northern Europe it has not. I should like to know if the Atlantic species of this type Cybele, Aphrodite, etc., are double-brooded, or if in the State of California a second generation of any other species has been observed.

As far as known these species hybernate in the larva state in a lingering condition, during which, at least in artificial breeding, many perish. The survivors attain in spring, in very short time, their full size, a circumstance in surprising contrast with the slow development during the winter months. They transform early in spring, and the pupa develops the imago generally in the month of June, but, of course, in different localities at according periods.

All species observed in their larva state fed on species of violet, but it is more than probable that other plants may serve for food as well.

In the locality where the second brood of *A. Calippe* was observed by me, the wild species of Viola disappear from sight in June, and are reduced to subterranean organs.

MEXICAN NOTES, III.

BY W. G. WRIGHT.

LAS TRES MARIAS. These are a group of five islands lying 80 miles west from San Blas. The three larger ones are named for the three Marys of sacred history, while the other two have also individual names. The larger islands are covered with a heavy growth of large cedar trees, which of late years have been largely cut and exported. This is the Spanish mahogany or Spanish cedar, of common use on the Pacific Coast for cabinet work and for cigar boxes. The cedar of these islands is of coarser grain than the trees grown on the adjacent mainland, being of more rapid growth, and is more easily worked. Salt works also exist at certain bays, where, it is stated, when the tide recedes it leaves a deposit of crystallized salt, without the necessity of evaporating works, which salt is scraped up and shipped without further preparation or purification; most of it going to Mexico for use in the mines. The same density of the sea water is said to be found at Salina Cruz, a port at the isthmus of Tehuantepec. The Tres Marias have twice been visited by naturalists, the first visitor being an ornithologist who worked up the birds, though not very exhaustively, I think; but his drawings frequently included the nests, eggs and young, with the plants peculiarly connected; all being done in a most exquisite manner, the figures being, it seems to me, equal to Audubon's. These figures, together with manuscript notes, are in the library of the university, at Berkeley. This ornithologist also collected incidentally in other branches, but only to small extent. The second visitor some years ago made a more general collection, including mammals, shells, insects, and everything of commercial value. This collection went chiefly to Germany, I believe; at any rate it is so reported, and it is consequently wholly lost to this country. Two gentlemen who knew the collector at the time of his visit, one of them being the agent in charge of the islands at the time, told me that the collector got a great quantity of bird skins, also many of mammals, together with many shells, but thought that the collection of insects was small, probably because the fauna was but meager in insect life on the islands, as he remained there several months, and would have got more if they had been abundant.

The Tres Marias islands are private property, owned by a firm of

Mexican gentlemen who bought them of the government a few years since for a small sum, and who have become wealthy in exporting the cedar, salt and other productions. Access to the islands is had only by permission of this firm. A mayordomo resides on the islands and manages the business for the owners, just as haciendas are managed for the non-resident owners, all over Mexico. This mayordomo I met in San Blas, and questioned at length as to the seasons, the fauna and flora, and all related matters, and from information thus gained I reluctantly concluded not to go there at this time, notwithstanding that the courteous owners had freely placed their vessels wholly at my service for conveyance; as the expenditures in time and in money would certainly be heavy, while the returns to be reasonably expected were a rather uncertain quantity, with a too large probability of being very meager. One of my pet projects upon coming to Mexico thus vanished into thin air, for I had long thought of and planned visiting these interesting islands, and had read up and hunted out all information I could before starting. Only two mentions are made in any existing books that I know of, about the Tres Marias: one by the buccaneer Wood, and the other by the record of the British ship *Rattler*, which visited them many years ago, and the whole of the information is contained in a very few lines, and is rather indefinite withal. I will therefore add that a naturalist wishing to visit the islands should plan to reach them in May or June. The months of August, September and October, and perhaps November, are subject to violent squalls and storms, so that the small vessels engaged in the trade do not run. Provision should therefore be made for a probably enforced lengthy stay. And if frijoles straight are not suited to the collector's dainty palate for a few months at a stretch, then probably he will do well to lay in a supply beforehand of food suited to his requirements.

I have been thus lengthy and particular about these islands, because when I wanted to go there, I could get almost no information from any quarter, for there is no printed work to consult, and the items here set down were picked up one at a time in various quarters, and are believed to be entirely reliable, and of use to the intending visitor.

San Blas. My pet project of visiting the Tres Marias having failed, I felt rather at a loss what to do next, so I looked about town, and, later, began to climb into the interior mountains. San

Blas, like Mazatlan, is hidden from view by a hill on approaching by sea. This hill has for seaward front a bluff or cliff about two hundred feet high, crowned with bushes and small trees. The hill is the high extremity of a narrow peninsula, which is quite low opposite the town A small river enters the ocean between this peninsula and the low, flat sand-spit upon which the town is built, only a yard or so above high tide, so that a tidal wave of very moderate size would completely obliterate every sign of habitation. Between the peninsula and the town is a sheltered, shallow "boca," which forms the only harbor. Vessels of four feet draft might float in it, but it is chiefly navigated by canoes and dug-outs. Formerly, or say three hundred years ago, in the days of the old Conquistadores, it is said, the depth of the harbor was greater, and it was the most secure and valuable one on the the entire coast. A mile or less back of the modern town is a hill, about 300 feet in height, sloping gently backward from the sea, so that the bluff has an appearance of increased height and boldness. Upon this high place the San Blas of the Conquistadores was built. It is a magnificent site for a town and gives the visitor a view of the surrounding coast and country, and why the modern inhabitants should choose instead to live down upon the low pestiferous sand-spit, is certainly a puzzle. One of the larger rivers of this coast empties into the ocean ten or fifteen miles to the northward, coming from the high "Tierra templada" of the interior mountains and the plains beyond. This river is known by different names in its different altitudes, as is customary in this country. At the immediate coast it is connected with San Blas harbor by an estero or tidal lagoon, by which boats and rafts from the river come to San Blas at high tide only. But the estero proper, or shallow tide waters and resultant mud flats that extend a long way back of the town, reeking and odorous in the hot sun at low tide—how can I do them justice! Suffice it to say that the first smell of it sent me to my quinine bottle for a tonic, and every day thereafter during my stay I renewed the dose; a precaution hardly ever thought of at any other place during my journey in Mexico.

But the birds! Oh, the birds! What quantities without limit were there; all sizes, all colors, all voices! On these mud flats vast numbers of aquatic birds find a most congenial home. Evidently they have no noses, nor sense of smell. Nor does yellow fever trouble them. Caymans of large size also adorn these unattractive and un-

healthy flats. One arm of the estero passes through the town, branching off in the rear into indefinite, muddy shoals. Over this branch a small bridge is built, the timber used being the mahogany previously mentioned. Loitering on this bridge, I could see large schools of fish, of small and of moderate size, in the rather clear water, while the immediate mud flats, covered at high tide, were alive with pink-clawed crabs which lived in holes in the mud. When undisturbed for a few moments they would come up and wave their claws about in a curious manner, but a movement of the visitor would cause every one of them to disappear. This little side estero over which the bridge is thrown, forms the chief sewer and, as it is in the heart of the town, it is peculiarly and emphatically a most noisome, stenchable abomination, even in the cool weather of winter, while as to its possibilities in the heats of summer, it is evident that the English tongue would lack adjectives adequate to the circumstances. The shores of the river mentioned a while back are well-timbered, furnishing supplies of many kinds of wood and timber, of which, however, only cedar or mahogany is cut and exported. This timber is cut and hewed to a square form in long sticks in the forest, and then floated in rafts down the river and into the estero at the town, where it is held for sale and export. No saw-mill adorns the shores of these waters, for by the wisdom of the rulers, the export duty on squared sticks is but moderate, but upon lumber it is prohibitory.

A short mile back of town, as I have said, is a hill of some 200 or 300 feet, a sheer precipice of basaltic rock on the seaward side, thinly veiled with lianas and climbing vegetation of various kinds, but on the landward side sloping gradually back, and covered with an impenetrable jungle of trees, vines, immense reeds, cacti and thorny bushes, among which are zapote trees and plantains growing wild, perhaps escaped from cultivation. As I went up the rather steep trail leading from town to the summit, I noticed that in places the path was over flat stones which appeared singularly out of place, yet well in place. Soon I found out that this was a real and original pavement laid by the old Conquistadores of Cortez' time, and led from the port where they built their ships to their homes upon this salubrious elevation, and upon it they tramped up and down at eve and at morn, as they went back and forth to their work, three hundred years ago. At the top of the hill are yet remaining miles

of stone-paved streets, a large ruined church, many ruined stone houses and all accommodation for a population of 8,000 people, now given over to owls and bats and a tropical vegetation well fitted to drive the ardent botanist daft, and inhabited by uncounted millions of eager mosquitoes, vigorous enough to bring him back to his senses again. How it comes to pass that with this high airy place at hand, the modern town should be on the low and necessarily unhealthy location about the estero, is wonderful. But the Mexican mind is in some things an unknown quantity and incomprehensible, and he understands not the first principle of modern sanitation or convenience, as we see such things.

As for these massive hilltop ruins, what scenes have they witnessed! One thing is certain, these Spaniards made here a solid stone-built city, intended not for a day, but for centuries. Walls laid in lime mortar, three or four feet thick, for the church, and two to three feet thick for the dwelling-houses, were not built in a day, nor for a day. The visitor now sees these massive walls dug into, and the ground in and about the buildings deeply excavated by treasure hunters. Even to this day old Spanish dollars are occasionally found. Indeed, may not this old hilltop, so long the home of these wild buccaneers, be the still secure hiding-place of their fabulous treasures? For the final evacuation by the Spaniards was unexpected and precipitate. At a time when many of the settlers or freebooters were absent, the neighboring tribes of Indians, whose enslaved labor had made these paved streets and massive buildings, and who because of the enslavement and forced labor had become hostile, made an attack upon the town, and drove away all the people, many of whom buried their silver *pesos*, having no way to remove them at the time. It is related that the last person to leave the city was a priest, who remained to secure some of the valuables belonging to the church, and when he came out he was so surrounded by savages that escape was cut off; so, to avoid torture, he ran to the precipice just in front of the church and jumped off to certain death upon the rocks below. Other than silver treasures remain to this day hidden at San Blas. Bronze cannon and valuable silver bells lie buried in the sands of the spit that forms the harbor. Not long ago a ship was loaded with cannon dug out of the sands, some of the guns being sixteen feet long, and they were exported and sold as old metal. It is believed that yet other ship loads still remain hidden. The low

lands around the modern town are adapted to tropical fruits. Cocoanuts are largely raised, also bananas, zapotes, quijotes, pine apples, and, in the hills, chirimoyas and many others. Oranges appear not to do well in the alkaline soil near the sea, nor cane nor coffee, but these do well in the interior high lands. The export price of bananas is $4 per 100 bunches; of pine apples, $5 per 100. The best bananas are never exported; they are small, cream colored, and very delicate in flavor.

One day at the landing I saw a canoe which had just come down the river, landing a cargo of india-rubber. It was black as tar, and looked very sticky and filthy. Its price at the landing is $16 per 100 pounds. Quite a large quantity of rubber is collected and sold here. The canoes used in this business, as, indeed, for most all other native traffic, are dug out from cedar logs, some of them being very large. The people, never very eager to adopt modern articles, are further restricted to the use of primitive things by the policy of government, which taxes to death all articles of manufacture or of modern use or convenience. Certainly government must exist, and as there are no land or property taxes, the expense must be borne by duties, and of such, on imports, exports internal traffic, there is no lack. If a planter has anything to sell he pays tax before he can vend it; every bag or basket of fruit or vegetables that comes to market is first of all taxed; so that, I am told, the poor man has no heart to raise anything more than for his own use. Truly, a poor man's paradise! Every inducement is offered to prevent him from doing anything. "Sun yourself and wait" should be the national maxim.

My first day's trip was toward the hills to the north, along the high road to Tepec. The morning was not very favorable, being overcast with thin clouds, but warm, about 90°, and at noon nearly 100°. The day was allotted to plants and incidental butterflies and beetles. Along the street fences and climbing over bushes were some pretty flowering vines, and in front of one thatched hut full of brown skinned natives was a vine running over a small tree that had the most lovely flower that I saw in Mexico. I managed to get only a few little bunches of them. Cypress vine here grew wild and stout and hardy enough to fight its own battles for life. Some acacias were in bloom, and many other plants and bushes, and flitting about were a few butterflies, of which I got specimens, mostly of worn, hardy winter species. Beetles also were rare, and I only got a few

small inconspicous ones. Soon I came to a watermelon patch. It was a grassy field, with occasional spots cleared by the hoe, and in those places a few puny plants were growing, blossoms and young fruit being on some of the larger ones in January. A wary white butterfly was fond of sunning itself on these bare spots, and chrysomelian beetles were preying upon the melon vines, doing the mischief they love so well to do. Beyond the enclosed fields about the town is the railroad leading to Tepec, now abandoned and overgrown with weeds and grass. Following this embankment, which runs out through a dense swampy jungle which is overflowed at high tide, I soon found some nice plants, and observed among the trees and about the shallow pools a great variety of lovely-plumaged birds—herons, ibis and egrets, and ten thousand other kinds quite new and strange, most of them very tame. But they were all safe, for I had no gun. At such a time a collector wants to divide up his person into several individuals, and send himself off in various directions after various objects of interest; it is a great pity to have such lovely objects run to waste entirely.

A league out I came to a hacienda, the land having become higher and drier. Here were growing cane, coffee, cocoanuts, bananas and many other things. But I should think the people living there would need to be of cast iron to resist the malaria from that terrible swamp, and steel-plated to resist the clouds of biting insects. The place, lovely in its tropical fruits, was somewhat interesting in its wild plants, but furnished no desirable insects, and as the sky had become overcast, threatening rain, the trip was ended. The next day was also rather overcast, but warm. I went out on another road toward the hills to the east. One has to go in a road. The whole country is so overgrown and covered with tangled thickets and thorny jungles, with plenty of vicious cactus plants, that the hunter must go in some path or road; he cannot go across lots anywhere, as in the north, and once in the path he cannot leave it to chase any showy bird or gorgeous butterfly. Soon the road ascended a gentle slope. Large trees grew all about, vines with showy flowers climbed over the bushes, and tall flowering reeds shot up through the underbrush. Soon rocks appeared under the dank vegetation, and among these I found some Adiantum fronds a yard across, and, clinging to the under side of a rock, some very small ferns new to me. These were the two most interesting ferns seen by me in Mexico. To reward

me for getting them, the sky suddenly darkened, and shortly a torrent of rain descended. The next day was dark and cloudy. The ensuing one was a tropical downpour of rain all day. My poor plants began to suffer for want of a drying. The third day was overcast, but I took the plants out into the street in the most sunny place I could find, and spread them out on the sidewalk up and down the way, utterly oblivious of any one's pleasure but my own. Soon the favorable situation modified, gusty winds began to puff their cheeks, and my joy in nicely drying plants was ruffled by such wild words and phrases of displeasure as occur to the most serene botanists at such times, for it began to rain! Then I thought I would improve a rainy hour by writing a letter, and went out to get paper. This store has "no papel;" the next one "no tenga." The third place has envelopes but no paper, and the salesman says he knows not where paper can be had, "probably not anywhere in San Blas." Another shop has no paper, but the proprietor politely directs me to a fifth, where at length for fifteen cents enough paper is bought for two letters.

Blessed, slow San Blas, in which it rained almost every day of my visit! Blessed, happy people of Mexico, who never write letters and have no use for letter paper, but whose faith in to-morrow suffices for many discomforts of to-day. But with all your blessedness and forlornness and retrogressiveness, I like you, I admire you, sometimes I would even be like you, a Mexicano myself; for if hope entices you not, despair never becomes your guest, and, if your blanket and your bread be sometimes scanty, they suffice in the glorious expectation of "*mañana*."

LŒFLINGIA SQUARROSA Nutt.

BY T. S. BRANDEGEE.

This species is described in Torrey & Gray's Flora of North America from "Sandy plains, San Diego, California." It extends at least to the valley of the Sacramento—often in company with *Lastarriæa Chilensis*, which has a similar habit. It is not credited to Mexico in Biologia Centrali-Americana, though Mr. C. R. Orcutt has brought it from northern Lower California, and the writer from as far down as latitude 28°. Hooker described and figured, Icones iii, t. 285, a form from Texas under the name *L. Tex-*

ana, which, if at all correctly delineated, varies from ours much more than ours from those of Europe, as shown in Gaertn. Sem. et Fruct, and in Cav. Icones. Gray, however, unhesitatingly reduces it to *L. squarrosa*, and even takes a Texan specimen to figure in his "Genera" as Nuttall's species. In DC. Prodromus only two species are mentioned, *L. Hispanica* and *L. pentandra*, with a doubt as to their being different species. Bentham & Hooker, in Genera Plantarum, express the same doubt. "Species descriptæ 5, inter se valde affines et forte omnes unius varietates, in regione Mediterranea, in Asia centrali, v. in America boreali crescentes."

Since that time another species has been described from Tehachapi in this State (*L. pusilla** Curran). It represents the other extreme from *L. Texana* Hook., and is consequently much nearer *L. Hispanica*. Although it is described as having five stamens, I have failed to find in the numerous flowers examined (the original specimens) more than three in any case. It is, however, very easy to be misled in these minute flowers covered with a viscous pubescence.

The petals or staminodia (?) are represented by small scales, attached in our triandrous forms to the base of the three inner sepals; they are very variable in the degree of development.

No one appears to have observed that the cotyledons are accumbent in at least the Californian forms, including the one described as *L. pusilla*. The figure in Gray's Genera (which, as before mentioned, was drawn from a Texan specimen) presents them as incumbent. Gaertner states the same thing, but his figure makes his statement doubtful.

The seeds are somewhat triangular in shape, and rather handsome objects on account of the difference in color of the cotyledons and the lighter albumen embraced by them. The groove between the cotyledons is plainly apparent through the testa. There are in the herbarium of the California Academy of Sciences no specimens from either Texas or Europe, but if, on investigation, it shall be found that the cotyledons of *L. Hispanica* are accumbent, it will be difficult to escape the conviction that the Mediterranean region, already known to be so generous to us in the matter of weeds, may credit its list with another.

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* Bull. Cal. Acad. i, 152.

RATTLESNAKE ANTIDOTES.

BY FRANK H. VASLIT.

A third Pacific Coast plant has put in a claim as an infallible cure for rattlesnake bites. This one is *Hieracium Scouleri*, a Composite plant, one of the hawkweeds of the Sierra Nevada. The two others (north of Mexico where there are many with similar reputation) are *Euphorbia*—various prostrate species confused; and *Caucalis microcarpa*, though as a matter of fact nine out of ten specimens of this last "infallible" remedy, sent in for identification by enthusiastic believers, are found to be *Daucus pusillus*.

While there is no objection to the trial of any or all of these remedies - and they probably serve a useful purpose, if the victim has any faith in them, in saving him from death by fright—yet, if the wound has been made in uncovered flesh by a vigorous rattlesnake not previously exhausted of its venom, the proper and most pressing thing for him to attend to is to set his household in order with all convenient speed.

RECENT LITERATURE.

North American Fauna, No. 3, Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Arizona, Parts 1, 2, 3, and 4, by DR. C. HART MERRIAM. The survey of this interesting part of Arizona has been productive of generalizations of the utmost interest to zoologists the world over, and especially to American naturalists. Fauna No. 3 is divided into five parts, the first four by Dr. Merriam, and the fifth, on the reptiles of the region, by Leonhard Stejneger. By far the most important part of the bulletin is Part I, which contains the generalizations on the distribution of animals in North America based on their distribution in the San Francisco Mountain Region. In the words of the author: "The most important of the general results are: (1) The discovery that there are but two primary life areas in North America, a northern (boreal) and a southern (subtropical), both extending completely across the continent and sending off long interpenetrating arms. (2) The consequent abandonment of the three life areas commonly accepted by naturalists, namely: the Eastern, Central and Western Provinces. (3) The recognition of seven minor life zones

in the San Francisco Mountain region, four of boreal origin, and three of subtropical or mixed origin. (4) The correlation of the four boreal zones with corresponding zones in the North and East." The theory of the distribution of animals, which is a most interesting and important field of zoological investigation, thus has new and unexpected light thrown upon it, which will change our views on this subject in its bearings upon North America, and probably the whole world. Although the other parts of the paper are of great interest they are not to be compared with the generalizations given in the first part. Part II gives an account of a brief visit to the Grand Cañon of the Colorado, with briefly annotated lists of the mammals and birds. Part III gives a list of the mammals of the San Francisco Mountain region, with full and interesting annotations on the habits and distribution of species and descriptions of many new forms. A valuable summary of the mammals of each zone on the mountain, closes the part. The new bat described from a single specimen must have been very strongly marked to have warranted making it a new species. Part IV is an annotated list of birds of the San Francisco Mountain plateau and the desert of the Little Colorado River.

The bulletin is illustrated with cuts of the skulls of new species of mammals and with maps showing life areas of the region visited and a provisional map of the faunal areas of North America. On the whole, Dr. Merriam deserves the highest credit for the energetic manner in which he conducted the survey, and for the valuable use he has made of his observations. **C. A. K.**

Land Mammals of San Diego County, California, by F. STEPHENS. The West American Scientist, vol. vii, August, 1890. A briefly annotated list of the mammals of this region. Local lists of mammals are quite rare, and as they are of great importance in determining faunal areas, they are always an addition to the literature on this subject.

Contributions from the U. S. National Herbarium No. II, By JOHN M COULTER. This is an account of the collection made by Mr. G. C. Nealley in the region of the Rio Grande in Texas. 903 species are enumerated, the following new: *Thelypodium Vaseyi, Abutilon Nealleyi, Sphæralcea subhastata, Pithecolobium Texense, Gaura Nealleyi, Aplopappus Nealleyi, Aplopappus Texanus, Viguiera longipes, Perityle Vaseyi, Ipomæa Nealleyi, Ipomæa Texana,*

Eriogonum Nealleyi, Euphorbia Vaseyi, Panicum capillarioides, Muhlenbergia Lemmoni, Sporobolus Nealleyi, Sporobolus Texanus, Trisetum Hallii, Bouteloua breviseta, Triodia eragrostoides, Triodia grandiflora, Poa Texana, Notholæna Nealleyi.
The grasses were determined by Dr. Vasey. The paper shows careful work, and proves that the very numerous misprints of the previous number are not a necessary concomitant of Government botanical publications. The author's notes on *Castalia;* the variability of *Greggia camporum; Hosackia rigida*, to which he reduces *H. puberula, H. Wrightii* and *H. Bryanti;* and on *Erigeron strigosus*, are of much interest.

Torrey Botanical Club, Bull. August. Of special interest to botanists of the Pacific Coast are A New Fern *(Cheilanthes Brandegei)*, by D. C. Eaton, and A Descriptive List of the Genus Heuchera, by William E. Wheelock, in which twenty-one species are enumerated. with descriptions, and a list of the specimens examined, a commendable feature of recent revisions. The author proposes one new species, *H. Nova-Mexicana*, and several new varieties. *H. maxima* Greene, is kept up on the author's specimen, although more recent collections from the same locality have shown that he failed to collect the small forms which connect it with those of the mainland.

Catalogue of Flowering Plants and Ferns of Santa Cruz County. Compiled and Edited by F. L. CLARKE, for the Board of Education of Santa Cruz County. Although this pamphlet bears on its cover the name of Dr. C. L. Anderson, its contents furnish abundant proof that he had no hand either in its arrangement or in the proof-reading. The list "embraces 628 flowering plants, 17 varieties of ferns (Filices), and 75 grasses." This, which is the last sentence in the work, sufficiently shows its character. For the rest there is such an assemblage of misprints, and laborious attempts to mix botanical names with popular ones as must have a remarkably confusing effect upon the minds of the school children for whom it is principally intended. For instance, the following: "Potatoes (Solonaceæ)—Solanum nigrum, S. umbelliferum, Datura Stramonium, Petunia parviflora." No localities are given for the plants, nothing but the bare list of names. It is claimed that this is "the first of its kind published in the State." Let us hope that it is also the last, and

that future Boards of Education who would probably employ a carpenter if they wished to build a house, will show their common sense by employing a botanist when they want a local Flora.

PROCEEDINGS OF SOCIETIES.

CALIFORNIA ACADEMY OF SCIENCES. *September 1, 1890.* President Harkness in the chair.

A complete set of the Zoological Record, twenty-five volumes, was presented by Mr. Prosper Huerne, and a vote of thanks to the generous donor was passed.

Dr. Behr made some remarks on the caprification of the fig, and read a letter from Mr. George Roeding of Fresno, in which he gave an account of the artificial fertilization of the Smyrna fig, and the consequent production of perfect seeds. The pollen of the caprifig was transferred to the cavity of the Smyrna variety by means of a tooth-pick. Dr. Behr called particular attention to the fact that this experiment of Mr. Roeding's proved conclusively that the formation of galls in the fruit was unnecessary either to the process of fertilization or the perfection of the fig.

By vote of the members, a paper by Frank J. Walker, on the location and area of the Sequoia forests, was read, and it was moved that a copy with maps be sent to the Secretary of the Interior and to members of Congress.

The Report of the Committee on Sequoia Park was read by Dr. Eisen, accepted, and copies ordered to be sent to Congress.

Memorial on Adley H Cummings read by Mr. Holladay, and a copy ordered to be sent to the family of the deceased.

Amendment to the Constitution of the Society, creating a class of associate membership, and restricting the admission of voting members to scientists, was passed by the Society and referred to the Council.

September 15, 1890. President Harkness in the chair.

A paper by Mrs. Theodore H. Hittell, on Indian pictographs, or painted stones, was read, and photographs exhibited of several of the most striking examples. No explanation of their meaning or use was offered. The resulting discussion was participated in by Dr. Eisen, Mr. Rixford and Mr. Troyer, and a committee of the two first named, and Mr. T. H. Hittell was appointed to take steps to interest the public in the preservation of these relics of the past.

Charles A. Keeler read some notes, and exhibited a map, showing the limited area now occupied on this coast by the English sparrow, and urged its extermination, before it is too late. He thought the best mode of procedure would be to appoint a few men to destroy them in every possible way. The bounty method had been found expensive and useless. The discussion was participated in by Drs. Eisen and Hewston.

PLATE VII.

C. E. Faxon del.

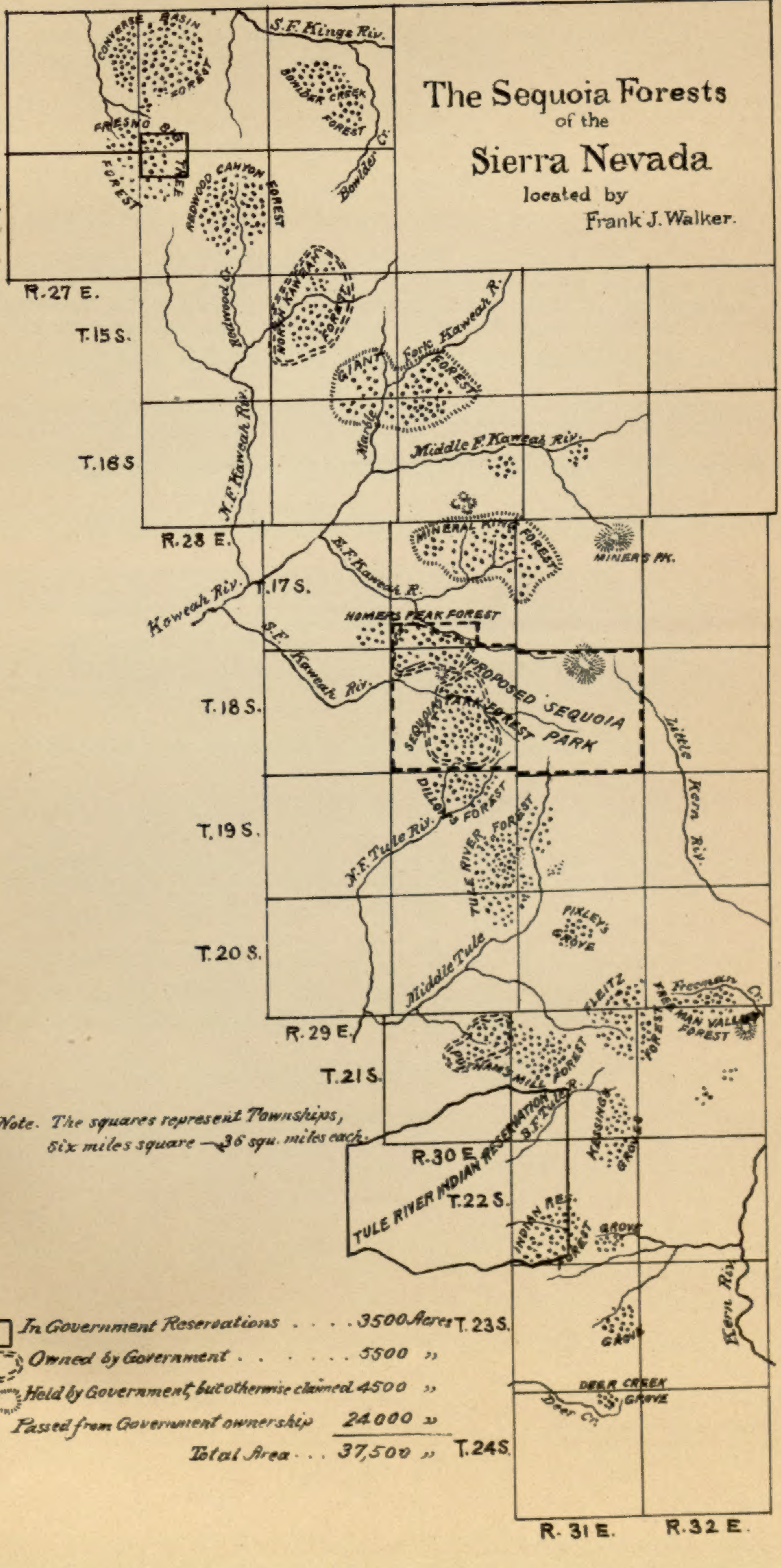
ASPLENIUM BLEPHARODES.

PLATE 8.

The Sequoia Forests of the Sierra Nevada

located by

Frank J. Walker.



Note. The squares represent Townships, six miles square — 36 squ. miles each.

	In Government Reservations	3500 Acres
	Owned by Government	5500 "
	Held by Government, but otherwise claimed	4500 "
	Passed from Government ownership	24000 "
	Total Area . . .	37,500 "